



## Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact [support@jstor.org](mailto:support@jstor.org).

$$\tan \alpha = \tan \beta + \frac{\pi M_c}{2M_s \cos^2 \beta}.$$

Knowing  $\alpha$ , the other quantities may be found.

176. Proposed by A. H. HOLMES, Brunswick, Me.

A solid cube weighs 300 pounds. If a power is applied at an angle of  $45^\circ$  at an upper edge of the cube, how many foot-pounds will be required to overturn the cube?

Solution by CHRISTIAN HORNUNG, A. M., Heidelberg University, Tiffin, Ohio.

In order to overturn the cube it must be revolved on a lower edge until the center of mass is vertically over that edge, and this will require the lifting of the 300 pounds through a distance  $a(\sqrt{2}-1)$ ,  $a$  being the edge of the cube, against gravity.

$\therefore$  the work done  $= 300a(\sqrt{2}-1) = 124.26a$  foot-pounds. Hence, the *size* of the cube can not be left out of the calculation.

178. Proposed by F. ANDERÉGG, A. M., Professor of Mathematics, Oberlin College, Oberlin, O.

A weight  $W$  is drawn up a rough conical hill of height  $h$  and slope  $\alpha$ . and the path cuts all the lines of greatest slope at the constant angle  $\phi$ . Find the work done in attaining the summit.

[Problem 11, page 226, *Johnson's Theoretical Mechanics*.]

Solution by G. W. GREENWOOD, M. A. (Oxon), Lebanon, Ill.

The weight  $W$  can be resolved in forces  $W \cos \alpha$  perpendicular to the surface,  $W \sin \alpha \cos \phi$  along its path, and  $W \sin \alpha \sin \phi$  perpendicular to these directions. The force required to move the body is therefore  $\mu W \cos \alpha + W \sin \alpha \cos \phi$ .

The path is the equiangular spiral  $s = r \sec \phi$ , and hence its length from the foot of the hill is  $nc \operatorname{osec} \alpha \sec \phi$ .

The work done is then

$$nc \operatorname{osec} \alpha \sec \phi (\mu W \cos \alpha + W \sin \alpha \cos \phi); \text{ i. e., } Wh(\mu \cot \alpha \sec \phi + 1).$$

179. Proposed by F. P. MATZ, Sc. D., Ph. D., Reading, Pa.

If the *velocity* of a body moving under an acceleration tending to the center *varies* as the radius of curvature, the body will describe a cycloid.

Solution by the PROPOSER.

Assume  $x = \operatorname{ver-sin}^{-1}(y) - \sqrt{(2ry - y^2)}$  to represent the orbit; then  $R = v$ ,  $= 2\sqrt{(2ry)}$ , which fulfills the conditions of the problem.